0CHAPTER-2

Polynomials

QUESTION BANK

(1) Degree of the zero polynomials is
(a) 0 (b) 1
(c) any natural number (d) not defined

(2) $\sqrt{2}$ is a polynomial of degree
(a) 2 (b) 0 (c) 1 (d) $\frac{1}{2}$

(3) The value of Polynomial $5x-4x^2+3$, when $x = -1$ is
(a) –6 (b) 6 (c) 2 (d) –2

(4) If $p(x) = x + 3$, then $p(x) + p(-x)$ is equal to
(a) 3 (b) 2x (c) 0 (d)6

(5) Zero of the zero polynomial is
(a) 0 (b) 1
(c) any real number (d) not defined

(6) One of the zeros of the polynomial $2x^2+7x-4$ is
(a) 2 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) –2

(7) If $x^{51} + 51$ is divided by $x+1$, the remainder is
(a) 0 (b) 1 (c) 49 (d) 50

(8) The value of $249^2 - 248^2$ is
(a) 1^2 (b) 477 (c) 487 (d) 497

(9) The coefficient of x is the expansion of $(x+3)^3$ is
(a) 1 (b) 9 (c) 18 (d) 27

(10) When $x^3 - ax^2 + 6x - a$ is divided by $x-1$, the remainder is
(a) 7–a (b) 7+a (c) 7 – 2a (d) 7 + 2a

(11) If $x+1$ is a factor of $ax^3 + x^2 - 2x + 4a - 9$, then the value of a is
(a) 2 (b) –2 (c) 3 (d) –3

(12) One of the factors of $(25x^2-1) + (1+5x)^2$ is
(a) 5 + x (b) 5 –x (c) 5x–1 (d) 10x

(13) If $a + b + c = 0$, then $a^3+b^3+c^3$ is equal to
(a) 0 (b) abc (c) 3abc (d) 2 abc

(14) The value of $55^3 - 25^3 - 30^3$ is
(a) 123750 (b) 125037 (c) 124750 (d) 124760

(15) If $x+y = -4$, then the value of

$x^3 + y^3 - 12xy + 64$ is

(a) –4 (b) 0 (c) 64 (d) –64

(16) The constant polynomial 0 is called ________polynomial.

(17) The degree of zero polynomial is ___________.

(18) _______may be a zero of the polynomial.

(19) The only zero of the linear polynomial $p(x) = ax + b, a \neq 0$ is $x =$ ________.

(20) Every linear polynomial has _____zero.

(21) Find the degree of the polynomial $3x^4 + 6x^3 + 5x - 7$.

(22) Using suitable identity, find $(2 + 3x)(2 - 3x)$.

(23) What is the number of zeroes of a zero polynomial?

(24) Find the remainder when $x^3 + 2x^2 + 3x + 1$ is divided by $x+1$.

(25) Factorise: $125x^3 + y^3$.

(26) Find the value of the polynomial $3x^3 - 4x^2 + 7x - 5$, when $x=3$ and also when $x=-3$.

(27) Check whether –2 and 2 are zeroes of the polynomial $x+2$.

(28) Find the remainder, when $x^3 - 3x^2 + 3x - 1$ is divided by $(x-1)$.

(29) Using factor theorem, show that $(x-1)$ is a factor of $(x^{20} - 1)$.

(30) Show that $(2x+1)$ is a factor of $2x^3 - 11x^2 - 4x + 1$.

(31) Determine if $(x+1)$ is a factor of $x^3 - x^2 - (2-\sqrt{2})x + \sqrt{2}$.

(32) If $x+y = 8$ and $xy = 15$, find $x^2 + y^2$.

(33) Factorise: $4a^2 - 9b^2 - 2a - 3b$.

(34) Factorise: $25x^3 - 121xy^3$.

(35) Without actually calculating the cubes, find the value of $55^3 - 25^3 - 30^3$.

(36) Find if $(-2x-5)$ is a factor of the polynomial $p(x) = 3x^4 + 5x^3 - 2x^2 - 4$ or not.

(37) Show that 2 is not of the polynomial: $p(y) = y^3 - y^2 - y + 1$.

(38) Find the value of k, if $x-3$ is a factor of $p(x) = kx^2 - x - 15$.

(39) Expand $\left(-\frac{x}{2} + y + \frac{1}{4}\right)^2$ by using an identity.

(40) If a+b= 12 and ab=27, find the value of a^3+b^3.

(41) Factorise: $8p^3 - q^3 - 12p^2q + 6pq^2$.

(42) Factories: $343a^3 - 729b^3$.

(43) If $x = -\frac{1}{2}$ is a zero of the polynomial $p(x) = 8x^3 - k$, then find the value of k.

(44) Factorise: $a^2+b^2-2(ab - ac + bc)$.

(45) Show that 1 is a zero of the polynomial $x^3 - 6x^2 + 11x - 6$.

(46) Factories: $\frac{a}{b}x^2 + \left(\frac{a}{b} + \frac{c}{d}\right)x + \frac{c}{d}$, $b \neq 0$, $d \neq 0$.

(47) Find the value of k for which 3x + 2 is a factor of $x^3 + kx^2 - 7x + 5$.

(48) Find the value of k $(k \neq 0)$ if $(x-3)$ is a factor of $k^2x^3 - kx^2 + 3kx - k$.

(49) Find the value of a, if x + a is a factor of the polynomial, $p(x) = x^3 + ax^2 - 2x + a + 4$.

(50) If $x^2 - bx + c = (x + p)(x - q)$, then factorise $x^2 - bxy + cy^2$.

(51) If $(x - a)$ is a factor of the polynomial $(x^3 - ax^2 + 2x + a - 1)$, find a.

(52) Prove that $(x^2 + x - 2)(x^2 - 4x + 3)(x^2 - x - 6)$ is a perfect square.

(53) Factorise: $x^4 + 2x^3y - 2xy^3 - y^4$.

(54) Factorise: $x^2 + \frac{1}{x^2} + 1$.

(55) Find the value of q if $x^3 + qx^2 - 4x - 12$ has a factor x+3. Also write the given expression as the product of its factors.

(56) Factorise: $8x^4 + 2x^2 - 1$.

(57) Factories: $x^{12} - 1$.

(58) Expand: $\left(x - \frac{1}{2}y + \frac{1}{3}z\right)^2$

(59) Find the zeroes of the polynomial:

$p(x) = (x-2)^2 - (x+2)^2$.

(60) Simplify: $\left(\frac{x}{3} + \frac{y}{5}\right)^3 - \left(\frac{x}{3} - \frac{y}{5}\right)^3$.

(61) If $x + \frac{1}{x} = 7$, then find the value of $x^3 + \frac{1}{x^3}$.

(62) Factorise : $16a^4 + 54a$.

(63) Factorise: $2\sqrt{2}a^3 + 16\sqrt{2}b^3 + c^3 - 12abc$.

(64) Factorise: $8x^3 + 27y^3 + 36x^2y + 54xy^2$.

(65) If $x^2 + y^2 = 90$ and $xy = 27$, then find the value of $x^3 - y^3$, when $x > y$.

(66) What are the possible expression for dimensions of a cuboid whose volume is $15y^2 - 100y + 125$.

(67) Divide the polynomial $x^4 + x^3 - 2x^2 - x + 1$ by $(x + 1)$ and verify remainder by using Remainder Theorem.

(68) The polynomial $p(x) = kx^3 + 9x^2 + 4x - 8$, when divided by (x +30, leaves a remainder $10(1 - k)$. Find the value of k.

(69) The polynomial $ax^3 + 3x^2 - 26$ and $2x^3 - 5x + a$, when divided by $(x - 4)$, leave the remainder R_1 and R_2 respectively. Find the value of a, if $R_1 + R_2 = 0$.

(70) When the polynomial $kx^4 + 3x^4 + 6$ is divided by $x-2$, it leaves the remainder R_1. When the polynomial $2x^3 + 17x + k$ is divided by $x-2$, it leaves the remainder R_2. If $R_1 = 2R_2$, find the value of k.

(71) When the polynomial $4x^3 + 3x^2 - 12ax - 5$ is divided by $x-1$, the remainder R_1. And when the polynomial $2x^3 + ax^2 - 6x + 2$ is divided by $x+2$, the remainder is R_2. If $3R_1 + R_2 + 28 = 0$, find the value of a.

(72) If $(x - 3)$ and $\left(x - \frac{1}{3}\right)$ are both factors of $ax^2 + 5x + b$, then show that $a = b$.

(73) Find the values of a and b so that the polynomials $x^3 - ax^2 - 13x + b$ has $(x-1)$ and $(x+3)$ as factors.

(74) Find the values of a and b so that $(x+1)$ and $(x-1)$ are factors of $x^4 + ax^3 - 3x^2 + 2x + b$.

(75) If $t^2 - 1$ is factor of $at^3 - t^2 - 2t + b$, find the values of a and b.

(76) If $(x+1)$ and $(x+2)$ are the factors of $x^3 + 3x^2 + \beta$.

(77) Factorise: $x^3 - 3x^2 - 10x + 24$.

(78) Factorise: $2x^3 - x^2 - 13x - 6$.

(79) Factorise: $2x^3 - 3x^2 - 17x + 30$.

(80) Factorise: $a^7 - ab^6$.

(81) If a+b+c=6, find the value of

$(2-a)^3 + (2-b)^3 + (2-c)^3 - 3(2-a)(2-b)(2-c)$.

(82) If x+y+z=1, xy+yz+zx=1 and xyz=–1, find the value of $x^3 + y^3 + z^3$.

(83) Factorise:

$27p^3(4q-2r)^3 + 64q^3(2r-3p)^3 + 8r^3(3p-4q)^3$.

(84) The volume of a cube is given by the polynomial: $p(x) = 8x^3 + 36x^2+54x+27$. Find the possible expression for the sides of the cube. Verify your answer when the length of the cube is 5 cm.

(85) Without actually calculating the cubes, find the value of

$(-1)^3 + (-2)^3 + (-3)^3 + (-4)^3 + 2(5)^3$.

Also write the identify used.

(86) Find the value of a if x + a is a factor of : $x^3 + ax^2 - 2x + a + 4$.

(87) Without actual division, prove that $2x^4-5x^3 + 2x^2-x+2$ is divisible by $x^2 - 3x + 2$.

(88) If $ax^3 + bx^2 + x - 6$ has x +2 as a factor and leaves a remainder 4 when divided by (x –2), find the values of a and b.

(89) Factories the following by splitting the middle term: $3x^2-x-4$.

(90) Find the integral zeros of the polynomial $p(y) = y^3-2y^2 + y +4$.

(91) Find the values of a and b so that 1 and 2 are the zeroes of the polynomial $x^3 - 10x^2 + ax + b$.

(92) If –1 is a zero of the polynomial $2x^2 + kx$, then find the value of k.

(93) Find the remainder obtained by dividing $p(x) = x^3 + 2x^2 - 9x - 20$ by x+3. Also find the remainder without actual division.

(94) By actual division, find the quotient and remainder when the first polynomial is divided by the second polynomial.

$P(x) = x^4 + 1$; $q(x) = x - 1$

(95) Find the reminder when $x^3 + 3x^2 + 3x + 1$ is divided by

(i) $x + 1$ (ii) $x - ½$ (iii) x (iv) $x + \pi$ (v) $5 + 2x$

(96) If $kx^3 + 9x^2 + 4x - 10$ is divided by $x + 3$, it leaves the remainder 5. Find the value of k.

(97) Check whether the polynomial : $q(f) = 4t^3 + 4t^2 - t - 1$ is a multiple of $2t + 1$.

(98) If the polynomials $2x + bx^2 + 3x - 5$ and $x^3 + x^2 - 4x + b$ leave the same remainder when divided by $x - 2$, find the value of b.

(99) If the polynomials $az^3 + 4z^2 + 3z - 4$ and $z^3 - 4z + a$ leave the same remainder when divided by $z - 3$, find the value of a.

(100) The polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$, when divided by $(x - 4)$, leave remainders R_1 and R_2 respectively. Find the value a if $2R_1 - R_2 = 0$.

(101) Using remainder theorem, prove that a + b, b + c and c + a are the factors of the polynomial $(a + b + c)^3 - (a^3 + b^3 + c^3)$.

(102) Factories : $(x + y)^2 - 10(x + y)z + 25x^2$.

(103) Factories : $9y^2 - 66yz + 121z^2$.

(104) Using a suitable identity, evaluate : 195 x 195 – 105 x 105

(105) Write the following cubes in expanding form:

(i) $(2x + 1)^3$ (ii) $(2a - 3b)^3$

(106) Simplify : $(2x - 5y)^3 - (2x + 5y)^3$

(107) If $a^2 + b^2 = 5$ and $ab = 2$, find $a^3 - b^3$.

(108) If $x + \frac{1}{x} = 5$, find $x^3 + \frac{1}{x^3}$.

(109) Verify: $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$

(110) Find the following products:

$(x^2 - 1)(x^4 + x^2 + 1)$

(111) If $a + b = 8$ and $ab = 6$, find $a^3 + b^3$.

(112) If $a + b + c = 6$, $abc = 6$ and $ab + bc + ca = 11$, find the value of $a^3 + b^3 + c^3$.

(113) If $a + b + c=9$, $a^2 + b^2 + c^2 = 27$ and $a^3 + b^3 + c^3 =81$, then find the value of abc.

(114) Prove that:

$(a + b)^3 + (b + c)^3 + (c +a)^3 – 3 (a+b) (b+c) (c+a) = 2 (a^3 + b^3 +c^3 – 3abc)$

(115) If $x + y + z=0$, show that $x^3 + y^3 + z^3= 3xyz$.

(116) Without actually calculating the cubs, find the values of each of the following:

$(-12)^3 +(7)^3 + (5)^3$.

(117) If a, b, c are non-zero and $a + b + c =0$, then prove that

$\frac{(b+c)^2}{3bc} + \frac{(c+a)^2}{3ac} + \frac{(a+b)^2}{3ab} =1$

(118) It is given that $3a + 2b = 5c$, then find the value of $27a^2 + 8b^3 -125c^3$, if abc=0.

(119) Factorise : $x^{12} – 1$.

(120) Find the values of a and b so that (x+1) and (x–1) are factors of $x^4+ ax^3 -3x^2+2x +b$.

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